Materials Science

EXAFS STRUCTURAL STUDIES OF ^{99m}Tc-CONTAINING RADIOPHARMACEUTICALS

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Much of the medical radioisotope imaging is done with drugs which incorporate ^{99m}Tc-containing compounds. The widespread use of this particular radioactive isotope is due to its relative ease of production and its short half-life. New ^{99m}Tc-containing drugs are being developed and a crucial step in the approval process for such pharmaceuticals is determining the structure of the compound in question. This requirement presents an obstacle for those substances which do not readily crystallize because standard techniques such as x-ray diffraction cannot be used. In such cases, it is possible to use the technique of x-ray absorption spectroscopy to measure the electronic and local atomic structure of the Tc atom. $TcCl_6$ is one of the materials which falls into this category, and we present here measurements of the extended x-ray absorption fine structure (EXAFS) of this compound. Our data confirm that the material consists of octahedrally coordinated Tc with six identical Tc-Cl bonds of 2.35 ± 0.2 angstroms.